

## **APPENDIX A**

### **Detailed Description of Critical Habitat Units**

#### **Unit 1: Klamath River Basin**

The Klamath River Basin is located in south-central Oregon and includes three critical habitat subunits (CHSUs): (1) Upper Klamath Lake CHSU in Klamath County; (2) Sycan Marsh CHSU in Klamath County; and (3) Upper Sprague River CHSU in Klamath and Lake counties. Total proposed critical habitat includes 475 km (295 mi) of streams representing 9.4 percent of the total stream lengths in the unit. Proposed critical habitat includes: 224.6 km (139.6 mi) of stream in 13 reaches, and 3,775 ha (9,327 ac) of lake in the Upper Klamath CHSU; 103.8 km (64.5 mi) of stream in 6 reaches, and 9,965 ha (24,625 ac) of marsh in the Sycan Marsh CHSU; and 146 km (91 mi) of stream in 10 reaches in the Upper Sprague CHSU.

#### **Unit 2: Clark Fork River Basin**

The Clark Fork River Basin unit includes 12 CHSUs, organized primarily on the basis of major watersheds. It includes most of western Montana and the Idaho panhandle.

The Lake Pend Oreille CHSU incorporates all waters in the Clark Fork River drainage downstream from Cabinet Gorge Dam (near the Montana/Idaho border), including the lower portion of the Priest River drainage, and the Pend Oreille River (the impounded downstream arm of Lake Pend Oreille).

The Lower Clark Fork River CHSU includes the three mainstem Clark Fork River impoundments (Cabinet Gorge, Noxon Rapids, and Thompson Falls reservoirs), the Clark Fork River between reservoirs and upstream to the confluence of the Flathead River, the lower Flathead River drainage downstream from Kerr Dam, and all tributaries to these waters.

The Middle Clark Fork River CHSU includes the mainstem of the Clark Fork River in western Montana and all tributary watersheds, from the confluence of the Flathead River upstream to the base of Milltown Dam, except for the Bitterroot River drainage.

The Upper Clark Fork River CHSU includes the entire Clark Fork River in western Montana upstream from Milltown Dam, with the exception of the Blackfoot River, Clearwater River, and Rock Creek drainages. The Priest Lakes and River CHSU includes the entire drainage of the Priest River upstream from Priest Lake Dam.

The Flathead Lake CHSU includes the entire Flathead River basin upstream from Kerr Dam, and the South Fork Flathead River drainage upstream from Hungry Horse Dam. Flathead Lake is the largest natural freshwater lake west of the Mississippi River in the United States. Twenty other natural glaciated lakes up to 2,800 ha (6,919 ac) in size are occupied by bull trout in this CHSU.

The Swan CHSU includes the entire Swan River drainage upstream from Bigfork Dam. The Hungry Horse Reservoir CHSU includes the entire South Fork Flathead River drainage upstream from Hungry Horse Dam. The Bitterroot CHSU includes the entire Bitterroot River drainage. The Blackfoot River CHSU includes the entire Blackfoot River drainage, with the exception of its tributaries in the Clearwater River CHSU. The Clearwater River and Lake Chain CHSU includes the Clearwater River drainage. The Rock Creek CHSU includes the entire watershed of Rock Creek.

### Unit 3: Kootenai River Basin

Just a short stretch of the Kootenai River lies in the U.S. where it loops down out of British Columbia. The Kootenai Unit thus comprises only the northwestern corner of Montana, including Libby Dam, and the northeastern tip of the Idaho panhandle. This unit includes two CHSUs: the Kootenai River and Bull Lake CHSU in Boundary County, Idaho and Lincoln County, Montana, and the Lake Koocanusa and Sophie Lake CHSU in Lincoln County, Montana.

The Service is proposing to designate critical habitat for bull trout in portions of 27 streams, 2 lakes, and 1 reservoir in this unit. The total stream distance is about 528 km (328 mi) in Montana, and 95 km (59 mi) in Idaho, for a total of 623 km (387 mi). The lakes and reservoir have a surface coverage of about 19,418 ha (47,982 ac), about 97 percent of which is the Lake Koocanusa reservoir. The Draft Recovery Plan (Service 2002) identified 10 local populations of bull trout in this unit as essential to recovery.

### Unit 4: Willamette River Basin

The Willamette River Basin Unit includes 337 km (209 mi) of stream and 1,600 ha (3,954 ac) of lake habitat in the McKenzie River and Middle Fork Willamette River subbasins of western Oregon. The unit is located primarily within Lane County, but also extends into Linn County. Currently, there are three known bull trout local populations in the McKenzie River subbasin, and one potential bull trout local population in the Middle Fork Willamette River subbasin. All four of these populations are identified as essential for bull trout recovery in the Draft Recovery Plan (Service 2002). With the exception of the mainstem Willamette River, the lower Middle Fork Willamette River, and Lost Creek, all segments proposed as critical habitat are currently occupied by bull trout, and all segments are essential to recovery as indicated in the recovery criteria in the Draft Recovery Plan (Service 2002).

### Unit 5: Hood River Basin

The Hood River Unit lies entirely within Hood River County, Oregon. The Unit includes the mainstem Hood River and three major tributaries: the Clear Branch Hood River, West Fork Hood River, and East Fork Hood River. A total of 178.0 km (110.3 mi) of stream, representing 21 percent of the total stream lengths in this unit, is proposed for critical habitat. Currently, there are two local populations (Clear Branch Hood River above Clear Branch Dam, and Hood River and tributaries below Clear Branch Dam) identified as essential to recovery (Service 2002). Two additional areas (West Fork Hood River and East Fork Hood River), where additional local populations necessary for bull trout recovery may be established, have also been identified. Presently, bull trout in the Hood River basin are believed to number less than 300 adult fish, emphasizing the need to establish additional local populations (Service 2002).

### Unit 6: Deschutes River Basin

The Deschutes River Basin Unit in central Oregon contains two CHSUs: the lower Deschutes and the upper Deschutes, separated by Big Falls, an impassible barrier on the Deschutes River at rkm 211.4 (rmi 131.4) (Stuart et al. 1997).

The Lower Deschutes CHSU is in Wasco, Sherman, Jefferson, Deschutes, and Crook Counties. Approximately 576 km (358 mi) of stream in the lower Deschutes River basin is proposed for critical habitat designation.

The Upper Deschutes River CHSU is located in Deschutes, Crook, and Klamath counties. Approximately 225.4 km (140.1 mi) of stream in the upper Deschutes River basin is proposed for critical habitat designation.

### Unit 7: Odell Lake

The Odell Lake Unit in central Oregon lies entirely within the Deschutes National Forest in Deschutes and Klamath counties. Total proposed critical habitat includes approximately 2,675 ha (6,611 ac) of lakes and 18.1 km (11.3 mi) of streams.

#### Unit 8: John Day River Basin

The John Day River Basin Unit in eastern Oregon includes the North Fork, the Middle Fork, and mainstem portions of the John Day River and their tributary streams in Wheeler, Grant, and Umatilla counties. A total of 1,080 km (671 mi) of stream is proposed for critical habitat.

#### Unit 9: Umatilla-Walla Walla River Basins

The Umatilla and Walla Walla Rivers Unit is located in northeastern Oregon and southeastern Washington. The unit includes 636 km (395 mi) of stream extending across portions of Umatilla, Union, and Wallowa counties in Oregon, and Walla Walla and Columbia counties in Washington. Currently, there are four known bull trout local populations in this unit, three in the Walla Walla River Basin, and one in the Umatilla River Basin. The Draft Recovery Plan (Service 2002) indicates the need to maintain these four local populations to provide for the recovered distribution of bull trout.

#### Unit 10: Grande Ronde River Basin

The Grande Ronde Unit extends across Union, Wallowa, and Umatilla counties in northeastern Oregon, and Asotin, Columbia, and Garfield counties in southeastern Washington. The unit includes the Grande Ronde River from its headwaters to the confluence with the Snake River and a number of its tributaries, the largest being the Wallowa River. Approximately 1,030 km (640 mi) of stream in the Grande Ronde River basin is proposed for critical habitat designation. Five bull trout populations are associated with streams that branch directly off the Grande Ronde River, and three populations are associated with streams flowing into the Wallowa River. One population in the upper Little Minam River is isolated by a barrier falls and is not connected to either of the main rivers. The Draft Recovery Plan (Service 2002) identifies all nine existing local populations as necessary for recovery.

#### Unit 11: Imnaha/Snake River Basins

The Imnaha/Snake Unit extends across Wallowa, Baker, and Union counties in northeastern Oregon and Adams and Idaho counties in western Idaho. The unit contains approximately 306 km (190 mi) of proposed critical habitat, and consists of two CHSUs: the Imnaha River basin and the Snake River basin from the Imnaha confluence upstream to Hells Canyon Dam. Seven bull trout local populations are identified in this unit, two in the Snake River CHSU, and five in the Imnaha River CHSU. The Draft Recovery Plan (Service 2002) identifies all seven existing local populations as necessary for recovery.

#### Unit 12: Hells Canyon Complex

The Hells Canyon Complex Unit encompasses basins in Idaho and Oregon draining into the Snake River and its associated reservoirs, from Hells Canyon Dam upstream to the confluence of the Weiser River. The Hells Canyon Complex unit includes a total of approximately 1,000 km (621 mi) of stream proposed as critical habitat.

The Unit contains two CHSUs: the Pine-Indian-Wildhorse CHSU and the Powder River CHSU. The Pine-Indian-Wildhorse CHSU is located within Adams and Washington counties in western Idaho, and Baker and Wallowa counties in northeastern Oregon. A total of 390 km (242 mi) of streams within this CHSU are proposed for critical habitat designation. This CHSU contains seven known local populations of bull trout and two potential local populations. The Powder River CHSU is located within Baker, Union, and Wallowa counties in northeastern Oregon. A total of approximately 610 km (379 mi) of streams within the Powder River CHSU are proposed for critical habitat designation. This CHSU contains 10 known local populations of bull trout and one potential local population.

### Unit 13: Malheur River Basin

The Malheur Unit is in the Malheur River Basin in eastern Oregon in Grant, Baker, Harney, and Malheur counties. A total of 389 km (241 mi) of streams and two reservoirs are proposed for critical habitat. There are two local bull trout populations and four potential local populations that are identified as essential to recovery in the Draft Recovery Plan (Service 2002).

### Unit 14: Coeur d'Alene Lake Basin

The Coeur d'Alene Lake Basin Unit in Idaho is broken into two subunits.

The Coeur d'Alene Lake CHSU lies within Kootenai, Shoshone, Benewah and Bonner counties. In total, there are approximately 6,903 km (4,290 mi) of streams comprising 502 named streams in the Coeur d'Alene Lake basin. Of this, 30 stream reaches or tributaries comprising 677 km (421 mi) are proposed as critical habitat. This equals approximately 6 percent of all streams and less than 10 percent of total stream length in the basin. Lakes comprising 12,727 ha (31,450 ac) of surface area are also being proposed as critical habitat.

The St. Joe River CHSU includes an estimated 3,574 km (2,221 mi) of streams encompassing over 254 named tributaries (Streamnet 2002) in Shoshone, Benewah, and Latah counties, Idaho.

### Unit 15: Clearwater River Basin

The Clearwater River Unit includes 3,063 km (1,904 mi) of streams and 6,722 ha (16,611 ac) of lakes proposed as critical habitat for bull trout in north-central Idaho. This large unit covers an area of approximately 2,423,691 ha (5,989,052 ac) and extends from the Snake River confluence at Lewiston on the west to headwaters in the Bitterroot Mountains along the Idaho/Montana border on the east. This unit is divided into seven CHSUs. These CHSUs include: Lower/Middle Fork Clearwater River, North Fork Clearwater River, Fish Lake (North Fork), South Fork Clearwater River, Lochsa River, Fish Lake (Lochsa), and Selway River. All local populations within this unit are essential to the recovery of bull trout (Service 2002).

### Unit 16: Salmon River Basin

The Salmon River basin extends across central Idaho from the Snake River to the Montana border. The critical habitat unit includes 7,688 km (4,777 mi) of stream extending across portions of Adams, Blaine, Custer, Idaho, Lemhi, Nez Perce, and Valley counties in Idaho. There are 10 CHSUs: Little-Lower Salmon River, Middle Salmon River Chamberlain, South Fork Salmon River, Middle Fork Salmon River, Middle Salmon River-Panther Creek, Opal Lake, Lemhi River, Lake Creek, Pahsimeroi River, and Upper Salmon River. Currently, there are 125 known bull trout local populations in this unit. The Draft Recovery Plan (Service 2002) indicates the need to maintain all known local populations and identifies nine additional potential populations.

### Unit 17: Southwest Idaho River Basins

The Southwest Idaho Unit includes a total of approximately 2,792 km (1,735 mi) of stream and 9 CHSUs in the Boise, Payette, and Weiser River basins (Ada, Adams, Boise, Camas, Canyon, Elmore, Gem, Payette, Valley, and Washington counties). The Boise River basin contains the Arrowrock, Anderson Ranch, and Lucky Peak critical habitat CHSUs. The Payette River Basin contains the upper South Fork Payette River, Deadwood River, Middle Fork Payette River, North Fork Payette River and Squaw Creek CHSUs; and the Weiser River basin contains the Weiser River CHSU. All proposed critical habitat designations are associated with populations of bull trout identified as essential to recovery in the Draft Recovery Plan (Service 2002).

#### Unit 18: Little Lost River Basin

The Little Lost River Unit is within Butte, Custer, and Lemhi counties in east-central Idaho. Approximately 184.6 km (115.4 mi) of stream in the Little Lost River Basin is proposed for critical habitat designation. There are 10 known local populations in the Little Lost River Basin and the Draft Recovery Plan (Service 2002) states that the persistence of all 10 populations is needed for species' recovery.

#### Unit 19: Lower Columbia River Basin

The Lower Columbia Unit consists of portions of the Lewis, White Salmon, and Klickitat Rivers, and associated tributaries in southwestern and south-central Washington. The unit extends across Clark, Cowlitz, Kilickitat, Skamania, and Yakima counties. Approximately 340 km (210 mi) of stream and 3 reservoirs covering 5,054 ha (12,488 ac) are proposed for critical habitat designation. Currently, there are three bull trout local populations in the Lewis River watershed and one in the Klickitat River. The Draft Recovery Plan (Service 2002) indicates the need to maintain those four local populations and establish four additional populations within the Lewis River watershed, and one in the White Salmon.

#### Unit 20: Middle Columbia River Basin

The Middle Columbia River unit encompasses the entire Yakima River basin located in south central Washington, draining approximately 15,900 square km (6,155 square mi). The basin occupies most of Yakima and Kittitas counties, about half of Benton County, and a small portion of Klickitat County. Thirteen local populations of bull trout occur in this unit, all of which are essential to recovery. The Draft Recovery Plan (Service 2002) recommends the establishment of three other local populations. Approximately 846 km (529 mi) of stream habitat and 6,066 ha (14,986 ac) of lake and reservoir surface area are proposed as critical habitat within this unit.

#### Unit 21: Upper Columbia River Basin

The Upper Columbia River Basin includes three CHSUs in central and northern Washington: (1) Wenatchee River CHSU in Chelan County; (2) Entiat River CHSU in Chelan County; and (3) Methow River CHSU in Okanogan County. A total of 909.7 km (565.4 mi) of streams and 1,010 ha (2,497 ac) of lake surface area are proposed for critical habitat.

Proposed critical habitat includes 364 km (226.1 mi) of stream in 21 stream reaches and one lake (990 ha; 2,445 ac) in the Wenatchee River CHSU, 78.5 km (48.8 mi) of stream in three stream reaches in the Entiat River CHSU, and 486.3 km (302.2 mi) of stream in 26 stream reaches and three lakes that total 22.6 ha (55.9 ac) in the Methow River CHSU.

#### Unit 22: Northeast Washington River Basins

The Northeast Washington unit includes bull trout above Chief Joseph Dam on the Columbia River. A total of 373.1 km (231.9 mi) of streams and 1,166 ha (2,880 ac) of lake surface area are proposed as critical habitat within this unit.

#### Unit 23: Snake River Basin in Washington

The Snake River Washington Unit includes two critical habitat subunits (CHSU) located in southeast Washington: (1) the Tucannon River CHSU located in Columbia and Garfield counties, and (2) the Asotin Creek CHSU within Garfield and Asotin counties. A total of 326 km (203 mi) of stream reaches are proposed as critical habitat within this unit.

#### Unit 24: Columbia River

This unit is located in Clatsop, Columbia, Multnomah, Hood River, Wasco, Sherman, Gilliam, Morrow, and Umatilla counties in Oregon and Pacific, Wahkiakum, Cowlitz, Clark, Skamania, Klickitat, Benton, Walla Walla, Franklin, Yakima, Grant, Kittitas, Chelan, Douglas, and Okanogan counties in Washington.

## Unit 25: Snake River

The lower Snake River is located in Washington (Franklin, Walla Walla, Columbia, Whitman, and Asotin counties) from its mouth to the confluence with the Clearwater River at the cities of Clarkston, Washington and Lewiston, Idaho. The Snake River is the border between Washington and Idaho from Clarkston/Lewiston upstream to the Oregon border at rkm 223.7 (rm 139.0). The Snake River forms the boundary between Idaho and Oregon from that point upstream to the limit of this critical habitat unit. This portion of the Snake River is within Nez Perce, Idaho, Adams, and Washington counties in Idaho, and Wallowa, Baker, and Malheur counties in Oregon.

## APPENDIX B

### Ownership of Lands Adjacent to Proposed Critical Habitat by Unit and Subunit

Exhibit B.1					
Approximate Distribution of Proposed Critical Habitat by Adjacent Land Ownership by Unit and Subunit					
Unit and Subunit #	Unit and Subunit	Federal (%)	State and Local (%)	Private (%)	Tribal (%)
<b>1</b>	<b>Klamath River Basin</b>	<b>69%</b>	<b>3%</b>	<b>28%</b>	<b>0%</b>
1.01	Upper Klamath Lake CHSU	84%	6%	10%	0%
1.02	Sycan Marsh CHSU	56%	0%	44%	0%
1.03	Upper Sprague River CHSU	56%	0%	44%	0%
<b>2</b>	<b>Clark Fork River Basin</b>	<b>54%</b>	<b>6%</b>	<b>39%</b>	<b>1%</b>
2.01	Lake Pend Oreille CHSU	36%	14%	50%	0%
2.02	Lower Clark Fork River CHSU - streams	31%	1%	55%	13%
2.03	Middle Clark Fork River CHSU	51%	3%	46%	0%
2.04	Upper Clark Fork River CHSU	25%	3%	72%	0%
2.05	Priest Lake and River CHSU	58%	33%	9%	0%
2.06	Flathead Lake, Flathead River, and 20 Headwater Lakes CHSU	68%	10%	22%	0%
2.07	Swan CHSU	36%	17%	47%	0%
2.08	Hungry Horse Reservoir CHSU	100%	0%	0%	0%
2.09	Bitterroot CHSU	64%	1%	35%	0%
2.10	Blackfoot River CHSU	34%	8%	58%	0%
2.11	Clearwater River and Lake Chain CHSU	51%	5%	44%	0%
2.12	Rock Creek CHSU	73%	1%	26%	0%
<b>3</b>	<b>Kootenai River Basin</b>	<b>53%</b>	<b>3%</b>	<b>44%</b>	<b>0%</b>
3.01	Kootenai River and Bull Lake CHSU	53%	3%	44%	0%
3.02	Lake Koocanusa and Sophi Lake CHSU	53%	3%	44%	0%
<b>4</b>	<b>Willamette River Basin</b>	<b>46%</b>	<b>0%</b>	<b>54%</b>	<b>0%</b>
<b>5</b>	<b>Hood River Basin</b>	<b>48%</b>	<b>1%</b>	<b>51%</b>	<b>0%</b>
<b>6</b>	<b>Deschutes River Basin</b>	<b>35%</b>	<b>1%</b>	<b>41%</b>	<b>23%</b>
6.01	Lower Deschutes CHSU	23%	1%	44%	32%
6.02	Upper Deschutes CHSU	64%	1%	35%	0%
<b>7</b>	<b>Odell Lake</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>
<b>8</b>	<b>John Day River Basin</b>	<b>54%</b>	<b>0%</b>	<b>46%</b>	<b>0%</b>
<b>9</b>	<b>Umatilla-Walla Walla River Basins</b>	<b>32%</b>	<b>2%</b>	<b>58%</b>	<b>8%</b>

Exhibit B.1					
Approximate Distribution of Proposed Critical Habitat by Adjacent Land Ownership by Unit and Subunit					
Unit and Subunit #	Unit and Subunit	Federal (%)	State and Local (%)	Private (%)	Tribal (%)
9.01	Umatilla CHSU	37%	0%	44%	19%
9.02	Walla Walla CHSU	28%	3%	69%	0%
<b>10</b>	<b>Grande Ronde River Basin</b>	<b>52%</b>	<b>0%</b>	<b>48%</b>	<b>0%</b>
<b>11</b>	<b>Imnaha/Snake River Basins</b>	<b>51%</b>	<b>0%</b>	<b>49%</b>	<b>0%</b>
11.01	Snake River CHSU	0%	0%	0%	0%
11.02	Imnaha River CHSU	0%	0%	0%	0%
<b>12</b>	<b>Hells Canyon Complex</b>	<b>47%</b>	<b>0%</b>	<b>53%</b>	<b>0%</b>
12.01	Pine-Indian-Wildhorse CHSU	65%	0%	35%	0%
12.02	Powder River CHSU	36%	0%	64%	0%
<b>13</b>	<b>Malheur River Basin</b>	<b>63%</b>	<b>3%</b>	<b>34%</b>	<b>0%</b>
<b>14</b>	<b>Couder d'Alene Lake Basin</b>	<b>58%</b>	<b>6%</b>	<b>35%</b>	<b>0%</b>
14.01	Couder d'Alene Lake CHSU	64%	6%	30%	0%
14.02	St Joe River CHSU	52%	7%	41%	0%
<b>15</b>	<b>Clearwater River Basin</b>	<b>78%</b>	<b>4%</b>	<b>17%</b>	<b>0%</b>
15.01	Lower/Middle Fork Clearwater River CHSU	14%	8%	76%	2%
15.02	North Fork Clearwater River CHSU	67%	12%	21%	0%
15.04	South Fork Clearwater River CHSU	85%	0%	15%	0%
15.05	Lochsa River CHSU	95%	0%	5%	0%
15.06	Fish Lake (Lochsa) CHSU	100%	0%	0%	0%
15.07	Selway River CHSU	100%	0%	0%	0%
<b>16</b>	<b>Salmon River Basin</b>	<b>86%</b>	<b>1%</b>	<b>13%</b>	<b>0%</b>
16.01	Little-Lower Salmon CHSU	78%	1%	21%	0%
16.02	Middle Salmon-Chamberlain CHSU	99%	0%	1%	0%
16.03	South Fork Salmon River CHSU	96%	1%	3%	0%
16.04	Middle Fork Salmon River CHSU	98%	0%	2%	0%
16.05	Middle Salmon-Panther CHSU	89%	0%	11%	0%
16.06	Lemhi River CHSU	65%	3%	32%	0%
16.07	Opal Lake CHSU	100%	0%	0%	0%
16.08	Lake Creek CHSU	86%	1%	13%	0%
16.09	Pahsimeroi River CHSU	66%	3%	31%	0%
16.10	Upper Salmon River CHSU	85%	0%	15%	0%

Exhibit B.1					
Approximate Distribution of Proposed Critical Habitat by Adjacent Land Ownership by Unit and Subunit					
Unit and Subunit #	Unit and Subunit	Federal (%)	State and Local (%)	Private (%)	Tribal (%)
<b>17</b>	<b>Southwest Idaho River Basins</b>	<b>78%</b>	<b>4%</b>	<b>17%</b>	<b>0%</b>
17.01	Anderson Ranch CHSU	87%	2%	11%	0%
17.02	Arrowrock CHSU	91%	3%	6%	0%
17.03	Lucky Peak CHSU	57%	18%	25%	0%
17.04	Deadwood River CHSU	95%	0%	5%	0%
17.05	Middle Fork Payette River CHSU	90%	3%	7%	0%
17.06	Weiser River CHSU	53%	8%	39%	0%
17.07	Upper South Fork Payette River CHSU	100%	0%	0%	0%
17.08	North Fork Payette River CHSU	47%	10%	43%	0%
17.09	Squaw Creek CHSU	48%	5%	47%	0%
<b>18</b>	<b>Little Lost River Basin</b>	<b>76%</b>	<b>2%</b>	<b>22%</b>	<b>0%</b>
<b>19</b>	<b>Lower Columbia River Basin</b>	<b>18%</b>	<b>10%</b>	<b>55%</b>	<b>17%</b>
19.01	Lewis River CHSU	29%	7%	64%	0%
19.02	White Salmon River CHSU	2%	0%	98%	0%
19.03	Klickitat River CHSU	6%	17%	35%	42%
<b>20</b>	<b>Middle Columbia Basin</b>	<b>44%</b>	<b>9%</b>	<b>40%</b>	<b>7%</b>
<b>21</b>	<b>Upper Columbia Basin</b>	<b>58%</b>	<b>0%</b>	<b>42%</b>	<b>0%</b>
21.01	Wenatchee River CHSU	59%	0%	41%	0%
21.02	Entiat River CHSU	47%	0%	53%	0%
21.03	Methow River CHSU	59%	0%	41%	0%
<b>22</b>	<b>Northeast Washington River Basins</b>	<b>58%</b>	<b>4%</b>	<b>37%</b>	<b>1%</b>
22.01	Pend Oreille River CHSU	58%	4%	37%	1%
<b>23</b>	<b>Snake River Basin in Washington</b>	<b>52%</b>	<b>16%</b>	<b>33%</b>	<b>0%</b>
23.01	Tucannon River CHSU	71%	23%	6%	0%
23.02	Asotin Creek CHSU	31%	8%	61%	0%
<b>24</b>	<b>Columbia River</b>	<b>39%</b>	<b>0%</b>	<b>61%</b>	<b>0%</b>
<b>25</b>	<b>Snake River</b>	<b>50%</b>	<b>0%</b>	<b>50%</b>	<b>0%</b>
<b>Total</b>		<b>65%</b>	<b>3%</b>	<b>31%</b>	<b>1%</b>
Notes: Figures taken or calculated from Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Klamath River and Columbia River Distinct Population Segments of Bull Trout", 50 CFR part 17 (Proposed Rule). Subunit totals may not sum to unit totals because of rounding errors.					

Exhibit B.2					
Approximate Surface Area of Critical Habitat in Lakes and Reservoirs in Hectares and Adjacent Land Ownership by Unit and Subunit					
Unit and Subunit #	Unit and Subunit	Federal* (%)	State and Local* (%)	Private* (%)	Tribal* (%)
<b>1</b>	<b>Klamath River Basin</b>	<b>64%</b>	<b>2%</b>	<b>35%</b>	<b>0%</b>
1.01	Upper Klamath Lake CHSU	84%	6%	10%	0%
1.02	Sycan Marsh CHSU	56%	0%	44%	0%
1.03	Upper Sprague River CHSU				
<b>2</b>	<b>Clark Fork River Basin</b>	<b>33%</b>	<b>16%</b>	<b>41%</b>	<b>10%</b>
2.01	Lake Pend Oreille CHSU	50%	50%	0%	0%
2.02	Lower Clark Fork River CHSU	23%	0%	70%	7%
2.03	Middle Clark Fork River CHSU				
2.04	Upper Clark Fork River CHSU				
2.05	Priest Lake and River CHSU	30%	0%	70%	0%
2.06	Flathead Lake, Flathead River, and 20 Headwater Lakes CHSU	10%	0%	68%	22%
2.07	Swan CHSU	63%	0%	37%	0%
2.08	Hungry Horse Reservoir CHSU	100%	0%	0%	0%
2.09	Bitterroot CHSU	75%	0%	25%	0%
2.1	Blackfoot River CHSU				
2.11	Clearwater River and Lake Chain CHSU	51%	5%	44%	0%
2.12	Rock Creek CHSU	73%	1%	26%	0%
<b>3</b>	<b>Kootenai River Basin</b>	<b>53%</b>	<b>3%</b>	<b>44%</b>	<b>0%</b>
3.01	Kootenai River and Bull Lake CHSU	53%	3%	44%	0%
3.02	Lake Koocanusa and Sophi Lake CHSU	53%	3%	44%	0%
<b>4</b>	<b>Willamette River Basin</b>	<b>46%</b>	<b>0%</b>	<b>54%</b>	<b>0%</b>
<b>5</b>	<b>Hood River Basin</b>				
<b>6</b>	<b>Deschutes River Basin</b>				
6.01	Lower Deschutes CHSU				
6.02	Upper Deschutes CHSU				
<b>7</b>	<b>Odell Lake</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>
<b>8</b>	<b>John Day River Basin</b>				
<b>9</b>	<b>Umatilla-Walla Walla River Basins</b>				
9.01	Umatilla CHSU				
9.02	Walla Walla CHSU				
<b>10</b>	<b>Grande Ronde River Basin</b>				

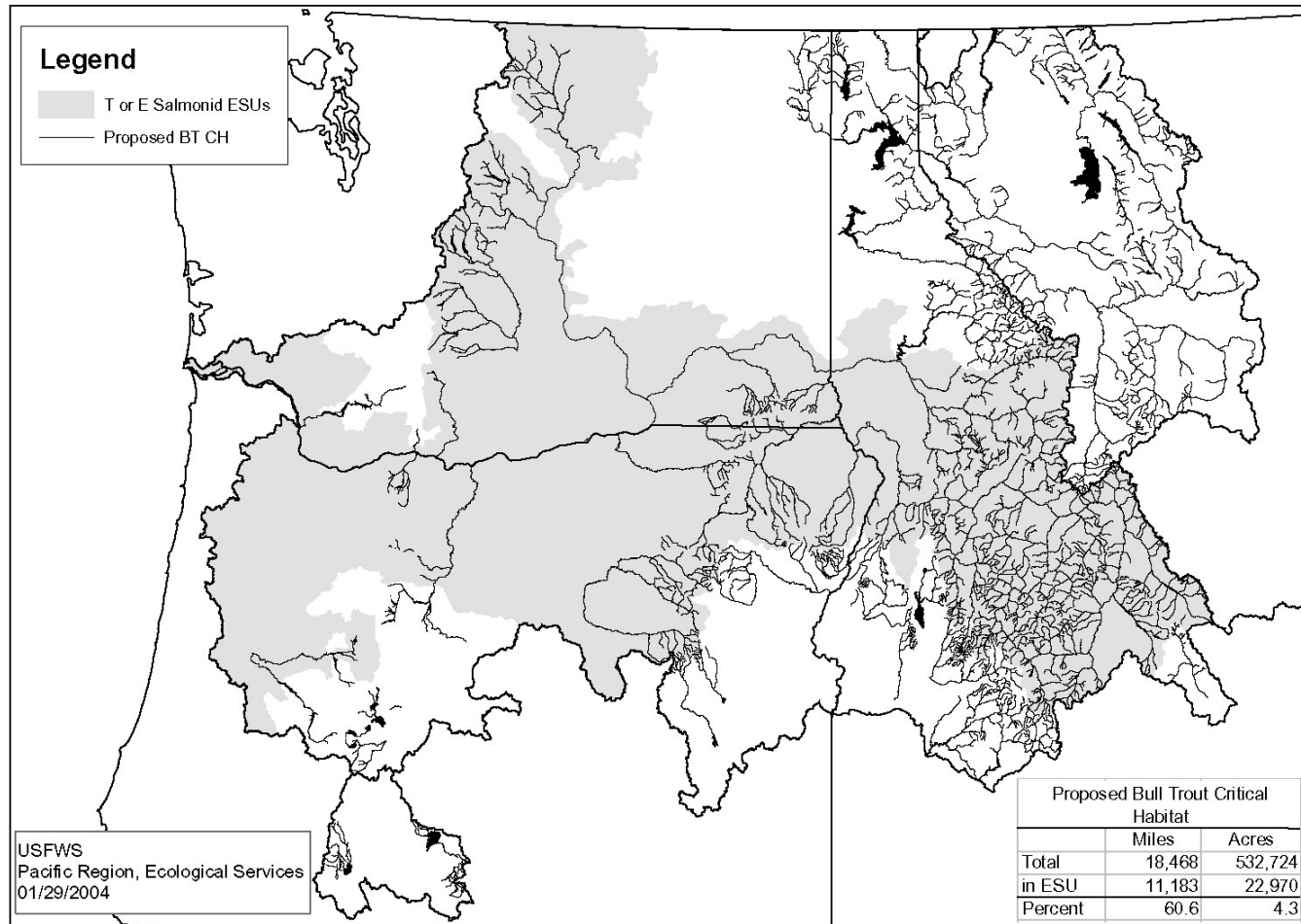
Exhibit B.2					
Approximate Surface Area of Critical Habitat in Lakes and Reservoirs in Hectares and Adjacent Land Ownership by Unit and Subunit					
Unit and Subunit #	Unit and Subunit	Federal* (%)	State and Local* (%)	Private* (%)	Tribal* (%)
<b>11</b>	<b>Imnaha/Snake River Basins</b>				
11.01	Snake River CHSU				
11.02	Imnaha River CHSU				
<b>12</b>	<b>Hells Canyon Complex</b>				
12.01	Pine-Indian-Wildhorse CHSU				
12.02	Powder River CHSU				
<b>13</b>	<b>Malheur River Basin</b>				
<b>14</b>	<b>Couer d'Alene Lake Basin</b>	<b>0%</b>	<b>0%</b>	<b>100%</b>	<b>0%</b>
14.01	Couer d'Alene Lake CHSU	0%	0%	100%	0%
14.02	St Joe River CHSU				
<b>15</b>	<b>Clearwater River Basin</b>	<b>67%</b>	<b>12%</b>	<b>21%</b>	<b>0%</b>
15.01	Lower/Middle Fork Clearwater River CHSU				
15.02	North Fork Clearwater River CHSU	67%	12%	21%	0%
15.03	Fish Lake (North Fork) CHSU	100%	0%	0%	0%
15.04	South Fork Clearwater River CHSU				
15.05	Lochsa River CHSU				
15.06	Fish Lake (Lochsa) CHSU	100%	0%	0%	0%
15.07	Selway River CHSU				
<b>16</b>	<b>Salmon River Basin</b>	<b>87%</b>	<b>1%</b>	<b>12%</b>	<b>0%</b>
16.01	Little-Lower Salmon CHSU				
16.02	Middle Salmon-Chamberlain CHSU				
16.03	South Fork Salmon River CHSU				
16.04	Middle Fork Salmon River CHSU				
16.05	Middle Salmon-Panther CHSU				
16.06	Lemhi River CHSU				
16.07	Opal Lake CHSU	100%	0%	0%	0%
16.08	Lake Creek CHSU	86%	1%	13%	0%
16.09	Pahsimeroi River CHSU				
16.1	Upper Salmon River CHSU				
<b>17</b>	<b>Southwest Idaho River Basins</b>	<b>66%</b>	<b>8%</b>	<b>26%</b>	<b>0%</b>
17.01	Anderson Ranch CHSU	87%	2%	11%	0%
17.02	Arrowrock CHSU	91%	3%	6%	0%

Exhibit B.2					
Approximate Surface Area of Critical Habitat in Lakes and Reservoirs in Hectares and Adjacent Land Ownership by Unit and Subunit					
Unit and Subunit #	Unit and Subunit	Federal* (%)	State and Local* (%)	Private* (%)	Tribal* (%)
17.03	Lucky Peak CHSU	57%	18%	25%	0%
17.04	Deadwood River CHSU	95%	0%	5%	0%
17.05	Middle Fork Payette River CHSU				
17.06	Weiser River CHSU	53%	8%	39%	0%
17.07	Upper South Fork Payette River CHSU				
17.08	North Fork Payette River CHSU	47%	10%	43%	0%
17.09	Squaw Creek CHSU				
<b>18</b>	<b>Little Lost River Basin</b>				
<b>19</b>	<b>Lower Columbia River Basin</b>	<b>29%</b>	<b>7%</b>	<b>64%</b>	<b>0%</b>
19.01	Lewis River CHSU	29%	7%	64%	0%
19.02	White Salmon River CHSU				
19.03	Klickitat River CHSU				
<b>20</b>	<b>Middle Columbia Basin</b>	<b>44%</b>	<b>9%</b>	<b>40%</b>	<b>7%</b>
<b>21</b>	<b>Upper Columbia Basin</b>	<b>41%</b>	<b>0%</b>	<b>59%</b>	<b>0%</b>
21.01	Wenatchee River CHSU	40%	0%	60%	0%
21.02	Entiat River CHSU				
21.03	Methow River CHSU -lakes	100%	0%	0%	0%
<b>22</b>	<b>Northeast Washington River Basins</b>	<b>58%</b>	<b>4%</b>	<b>37%</b>	<b>1%</b>
22.01	Pend Oreille River CHSU	58%	4%	37%	1%
<b>23</b>	<b>Snake River Basin in Washington</b>				
23.01	Tucannon River CHSU				
23.02	Asotin Creek CHSU				
<b>24</b>	<b>Columbia River</b>				
<b>25</b>	<b>Snake River</b>				
<b>Total</b>		<b>40%</b>	<b>11%</b>	<b>43%</b>	<b>6%</b>
Notes: * Blank cells indicate units or subunits with no lakes or reservoirs proposed for critical habitat designation. Figures taken or calculated from Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Klamath River and Columbia River Distinct Population Segments of Bull Trout", 50 CFR part 17 (Proposed Rule). The Proposed Rule describes approximately 4,400 lake acre of proposed critical habitat in the Deschutes River basin and 5,900 lake acres in the Malheur River basin, however, the Proposed Rule does not describe the adjacent land ownership. Subunit totals may not sum to unit totals because of rounding errors.					

## **APPENDIX C**

### **Overlap of Proposed Bull Trout Critical Habitat and Salmon and Steelhead Habitat**

**Bull Trout Proposed Critical Habitat Compared to Listed (Threatened or Endangered)  
Salmonid ESUs in the Columbia River and Klamath River DPSs**



## APPENDIX D

### Listing of All Suggested Project Modifications Found in Formal Biological Opinions: By Activity Type

#### HIGHWAY PROJECT MODIFICATIONS

##### Bridge Replacement

- Seasonal limitation on in-water work.
- Construction activities can occur within dewater coffer dams or drilling casings provided that all water from inside these structures is pumped to contained settling ponds on the river bank, and that equipment access to these structures is made via the work bridges.
- To the maximum extent possible, the existing bridge will be disassembled and removed without pieces being allowed to fall into the river.
- If portions of the old bridge do fall into the river, they will be removed from the river by lifting them onto the work bridge as opposed to dragging them through the water to the river bank.
- Blasting required will be contained to the maximum extent possible using 'blankets' to attenuate the blast's pressure wave in the water and to prevent debris from entering the river.
- Work bridge shall be constructed to withstand winter icing and spring runoff to prevent collapse into the river, or removed prior to winter icing conditions.
- Construction of access road under new bridge and the attendant wall and riprap placement shall be conducted at low river flows and 'in the dry'.
- BMPs for erosion control:
  - constructing silt fencing.
  - using straw bales in borrow ditches.
  - quickly reseeding and revegetating all disturbed areas.
  - using bank stabilization measures for disturbed channel banks.
  - daily visual monitoring of sediment minimization structures.
- Construction zones within coffer dams will be checked for trapped bull trout, any found bull trout will immediately be returned to the river.
- Notification on finding dead, injured or sick bull trout.
- Sediment mitigation control until revegetation goals are reached.
- Conservation and reuse of topsoil and organic duff layers during construction and revegetation.
- Hydroseed of all cut and fill slopes resulting from road reconstruction and alignment.
- Ensure post-construction success rate of vegetation (i.e., 95 percent cover within 6 years).
- All habitat protection and conservation measures will be incorporated into contracts relating to the project.
- Monitor the levels of soils and habitat disturbances and the revegetative efforts and successes.
- All waste fuels, lubricating fluids, herbicides, and other chemicals will be collected and disposed of in a manner that ensures that no adverse environmental impact will occur.

##### Repair

- Passage shall provide for both adult and juvenile forms of all salmonid species.
- Seasonal limitation on in-water work.
- All in-water work will be done within a coffer dam.
- Minimize alteration or disturbance of stream banks and existing riparian vegetation.
- Minimize amount of riprap used, when it is necessary, only clean, non-erodible, upland angular rock of sufficient size for long-term armoring will be used.
- Native streambed materials will be stockpiled out of the 2-year floodplain for later reuse in the project - place on top of riprap.
- An erosion control plan will be prepared and implemented by ODOT or its contractor.
- effective erosion control measures shall be in-place at all times, construction will not begin until controls are in place.
- All exposed areas will be replanted with native vegetation.
- All erosion control devices will be inspected during construction.

- Where feasible, sediment laden water created by construction activity shall be filtered before it leaves the right-of-way or enters an aquatic resource area.
- A supply of erosion control measures will be kept on site.
- All equipment used in-stream will be cleaned at a location that is outside of the 5-year floodplain prior to entering the 2-year floodplain.
- Material removed during excavation shall only be placed in locations where it cannot enter sensitive aquatic habitat.
- Develop a site-specific spill prevention and countermeasure or pollution control plan.
- Fuel storage, refueling and servicing of construction equipment and vehicles will be located at least 300 feet from the 2-year floodplain.
- Hazmat booms will be installed on all aquatic systems where:
  - significant in-water work will occur or where significant work occurs within the 5-year floodplain or where sediment/toxicant spills are possible
  - the aquatic system can support a boom setup
- Hazmat booms will be maintained on-site in locations where there is potential for a toxic spill, diapering of vehicles to catch any toxicants will be maintained when the vehicles have any potential to contribute toxic materials into aquatic systems.
- No surface application of nitrogen fertilizer will be used within 50 feet of any aquatic resource.
- Boundaries of the vegetation clearing limits will be flagged, ground will not be disturbed beyond the flagged boundary.
- Alteration of native vegetation will be minimized.
- Riparian understory and overstory vegetation removed will be replaced.
- Erosion control measures will be monitored.
- Failed plantings and structures will be replaced.
- A plant establishment period will be required.
- Monitoring reports required.

#### Maintenance

- Seasonal limitations on in-water work.
- Development of contingency plan in the event of adverse weather conditions or other foreseeable undesirable conditions.
- Survey by biologists prior to in-channel work to detect the presence of migrating adult fish, paired fish or redd construction.
- Minimize all clearing of woody vegetation, salvage vegetation for replanting where possible, revegetate newly created slopes and impacted riverbanks.
- Follow stringent erosion control measures including frequent inspections.
- Report of take.
- All plantings shall be watered and maintained and replaced as needed for a period of 3 years.

### **FISHERIES PROJECT MODIFICATIONS**

#### Coho reintroduction terms and conditions

- Implement project to minimize risk of adverse effects to bull trout; involve Service.

#### Bull trout reintroduction terms and conditions

- Monitor macroinvertebrate densities prior to application of antimycin.
- Keep creek closed to sport fishing.
- Create neutralization stations using potassium permanganate to reduce downstream impacts of antimycin.
- Collect dead bull trout.

#### Ecological survey terms and conditions

- Follow State of Montana's electrofishing guidelines and make sure all electrofishing equipment works properly.
- Schedule sampling at each site when bull trout are least likely to be present.

#### Fish bypass terms and conditions

- Conduct channel work in the dry when possible.
- Implement spill prevention and control plan.
- Replace hydraulic fluid in heavy equipment with biodegradable, non-toxic hydraulic fluid.
- Clean heavy equipment of pollutants.
- Use sediment control devices.
- Snorkel the project reach to determine bull trout presence.
- Capture stranded fish by nets and electrofishing and transport to main creek.
- Monitor channel during dry out period.
- Replant riparian areas using native species.
- Revegetate disturbed area during fall or spring.
- Monitor plants for at least 5 years to ensure 80 percent survival.
- Construction will take place within stipulated time period and not exceed 365 days.
- Develop wetland mitigation and monitoring plan.
- Conservation recommendation: increase riparian planting.

#### Squawfish removal terms and conditions

- Instruct anglers on proper handling and release of caught salmonids.
- Consider using barbless hooks.

#### Salmon study terms and conditions

- Instream work contingent on not finding spawning bull trout.
- Survey for bull trout and train field crews in bull trout identification.
- Follow electrofishing guidelines.
- Minimize vegetation degradation to avoid exposing bare soils.

### **FOREST MANAGEMENT PROJECT MODIFICATIONS**

#### RESTORATION

- Develop an environmental education program to inform the public about structures and woody debris, aquatic habitat, and riparian dependent species.
- Steam clean heavy equipment before it enters the stream channel.
- Minimize the amount of time that heavy equipment is in the stream.
- Follow WDFW Hydraulic Permit guidelines.
- Subsoil, close or otherwise limit sediment input.
- Require 0.25-inch mesh fish screens on suction inserts at pump chances.

#### Trail Bridge Repair:

- Work during low stream flow.
- Minimize use of mechanized equipment within the ordinary high-water mark.
- Prepare and approve spill containment plan.
- Store and disperse any excavated material away from the channel.
- Install sediment fences.
- Access only via existing trail.
- Silt fences.
- Minimize disturbance to immediate riparian vegetation.
- Log placement, as needed.

#### Log Placement:

- Helicopter fueling and landing areas will be located least 150 to 200 feet from open water.
- Fuel trucks and landing sites within the riparian reserve.

#### Horse Camp:

- Limit excavator work and road decommissioning to driest time of the year (August or September).
- Place and secure LWD along the stream side.
- Minimize disturbance to existing riparian vegetation.
- All mechanized material will be cleaned of all foreign plant materials and soil prior to moving into project area.

#### ROAD CONSTRUCTION

- Minimize sediment introduction resulting from cattle grazing in riparian areas.
- Implement riparian management areas on each side of affected streams.
- Limit use of ground-based equipment within X feet of channel migration zone.
- Design and implement water temperature monitoring plan.
- Monitor road use and maintenance. Ensure no public use occurs on gated or barriered roads.
- Design and implement a sediment monitoring plan.
- Monitor compliance with required terms and conditions.
- Design and implement a plan to monitor cattle use in harvested riparian areas and at stream crossings resulting from the project.
- Limit in-stream construction impacts to actions providing fish passage, bank and sediment stability, improve or create fish habitat above or below project area.
- Monitoring of fisheries and sediment delivery by fishery biologist during in-water work period.
- Provide passage around the site during in-water construction period.
- Education of contractors.
- Minimize disturbance to native riparian vegetation.
- Monitor success of any riparian replanting.
- Monitor stability of finished grade slopes and elevations.
- Survey by hydrologist and fisheries biologist to help determine most effective design for restoring channel stability and integrity.
- Seasonal restrictions on construction activities.
- Maintain all straw bales and filter fences where road maintenance could deliver sediment to streams.

#### TIMBER ACTIVITIES

- For culvert installation and/or replacement, follow the fish passage criteria developed by the Washington Department of Fish and Wildlife.
- Monitor the condition of streams for sedimentation.
- Road-related and in-stream activities which may affect bull trout habitat will be conducted during recommended in-water work periods.
- Initiate an interdisciplinary and integrated functional road-shed analysis.
- Provide information summary tables to the Service describing implementation and effectiveness monitoring of timber sale.
- Install and maintain sediment barriers to prevent/minimize the amount of sediment entering the river.
- Install erosion control matting.
- Seed areas denuded of vegetation.
- Mulch newly seeded areas and other areas subject to erosional processes.

## OTHER - RECREATION

- Inventory dispersed sites, single purpose roads to trail heads, and riparian trails and provide an annual report recommendation for sites, roads, and/or trails that require management actions.
- Implement a dispersed recreation public education program to increase public knowledge of importance of healthy riparian habitat.
- Where possible pull dispersed recreation sites back from the edge of stream and block off erosive streambank.

## **DAM AND HYDROPOWER PROJECT MODIFICATIONS**

### **Modifications Associated with Hydropower Dams and Related Reservoirs**

#### Fish passage terms and conditions

- Net and haul species over dam.
- Study fish passage options.
- Maintain conditions that allow for unimpeded passage of fish past construction sites during remediation/replacement of pipeline and bridge construction.
- Ensure upstream and downstream passage is not impeded at dams.
- Modify, operate, and maintain fish screen cleaning system, fish return bypass conduit, bank fish ladder.
- Design and implement upstream and downstream long-term fish passage facilities.
- Capture, tag, and monitor movement and migration of juvenile bull trout (install traps).
- Tag and transfer adult bull trout.
- Investigate methods to provide safe fish passage around dams.
- Adaptive refinement of mitigation measures for fish ladder and fish screen based on monitoring.
- Provide fish passage for juvenile and adult bull trout traveling upstream and downstream.
- Monitor prey species and provide safe fish passage for prey species.

#### Entrainment reduction terms and conditions

- Study use of strobe light system to prevent entrainment of bull trout.
- Install fish screens on water intake to prevent entrainment.
- Develop plan to handle and relocate bull trout that are trapped and collected during fish salvage efforts.
- Evaluate fish screen impacts and eliminate sources of increased injury associated with increased water levels.
- Construct, operate, maintain adult barrier at terminus.
- Reduce entrainment due to reservoir operations - install entrainment barrier, develop bypass tubes, study long-term solutions to entrainment problem.
- Adaptive refinement of mitigation measures for fish ladder and fish screen based on monitoring.
- Feasibility study of fish screen to reduce take during dewatering.

#### Adequate flow terms and conditions

- Implement operational constraints to minimize severe fluctuations in flow levels.
- Monitor to provide information on distribution, timing, and usage of dams and reservoir system.
- Store and release sufficient water to provide base flow prior to salmon flows and associated ramping volumes (12/20/2000).
- Re-design WTC tower based on overlapping/telescoping weir gates instead of ports, allowing flow to be taken from the surface at any pool elevation.
- Construct, operate, maintain rock drop water diversion structures.
- Conduct hydraulic and biological evaluation of tailrace barrier one year after operation.
- maintain instantaneous minimum flows downstream at 1,000 cfs.
- Operate project in continuous run-of-river mode.
- Ensure that reservoir operations to not result in significant de-watering of reservoirs.
- Increase minimum dam discharge to reduce effect of power peaking operations.

#### Total dissolved gases/temperature terms and conditions

- Evaluate and potentially modify equipment to reduce total dissolved gases (TDG) and temperature effects.
- Develop and implement a dissolved gas supersaturation control, mitigation, and monitoring program.

#### Habitat protection terms and conditions

- Protect riparian corridor habitat.
- Minimize downslope sedimentation from abandoned and active logging roads.
- Comply with state water quality standards.
- Limit extent of woody debris removal.
- Relocate and use woody debris for habitat restoration within former lake bed and downstream reach.
- Construct containment berm to control erosion.
- Re-establish appropriate vegetation in the 20 foot drawdown zone.
- Control erosion, slope instability to minimize sedimentation and control spills of chemical/petroleum products.
- Placement of large woody debris complexes in pond area of power canal to provide escape cover from predators, structural diversity, and predation refuge.
- Planting native conifer trees on south bank to maintain shade and temperatures.

#### Other terms and conditions

- Monitor and control exotic fishes.
- Develop a plan to preserve genetic variability of Lake Pend Oreille bull trout.

#### Conservation recommendations

- Educate anglers that use associated reservoirs and rivers.
- Study and report annually observations of bull trout captured in field activities
- Fund and implement Lake Billy Chinook sport harvest/angler survey.
- Fund and carry out disease studies.
- Engage landowners and water users in watersheds surround projects in cooperative resource management.
- Participate in life history investigations.
- Cooperate with National Forest to better describe bull trout.
- Incorporate articles related to bull trout recovery into FERC license agreements.
- Cooperation with Idaho Fish and Game Department and Montana Department of Fish, Wildlife, and Parks to promote bull trout recovery, and survey and monitor populations.

### **GRAZING PROJECT MODIFICATIONS**

- Route sheep so as to avoid fish-bearing portions of streams at watering locations.
- Locate camping and sanitation facilities outside riparian reserves.
- No sheep grazing or bedding allowed in conifer plantations with trees  $\leq 3$  feet tall.
- Disperse grazing away from riparian areas.
- Avoid stream use for longer than what is needed to water the flock.
- Herd cattle out of riparian reserves whenever they are found to be bedded down in these areas.
- Implement the 4 to 5 inch stubble height utilization standard.
- Review all recently planted regeneration stands with the permittees and identify all appropriate measures and provisions to ensure adequate resource protection against cattle grazing damage to seedlings.
- Avoid salting and bedding of stock in riparian areas.
- When crossing fish-bearing streams after August 1, do so in areas dominated by sand or streambed substrate greater than 4 inches in diameter.
- Limit grazing period (early season = May 15 to July 31).
- Restrict number of cattle.
- Set maximum allowed forage/browse utilization levels.
- Turn-on away from creek.
- Provide rider to remove cattle from creek when found.
- Remove 90 percent by pasture close date, remove remaining 10 percent within 5 days.

- Establish photo monitoring prior to turn-out and immediately following grazing period.
- Monitor forage/browse utilization.
- Monitor willows.
- Monitor for unauthorized and excess livestock as often as necessary.
- Establish effectiveness monitoring sites to monitor changes in riparian vegetation, water quality, and channel morphology.
- Assure consistent implementation of grazing-related measures and standards specified in INFISH and PACFISH.
- Monitor cattle access to river after completion of fence.
- Ensure all BLM authorities are used to preclude unauthorized livestock use of the new road system, including development and implementation of specific measures to ensure functionality of existing and new management features (gates, barriers, etc.).
- Install fences or other barriers (slach, cattle guards, etc.) where forest or other activities have removed or reduced the effectiveness of natural barriers.
- Identify the needs and responsibilities for fence repair and maintenance, and pipeline and water trough repair and maintenance.
- Provide necessary training for all permittees and range riders to monitor livestock use and to understand objectives and standards stated in the AOP.
- Ensure allotment use guidelines and management objectives (utilization levels, stubble height, prescribed grazing systems) are strictly adhered to and successfully met.
- Provide off-channel watering facilities and salt for livestock away from the streams to pull use away from riparian areas.
- Report to the Service annually, following the grazing season, the results of monitoring.

## **AGRICULTURE PROJECT MODIFICATIONS**

### Irrigation channel project terms and conditions

- Complete in-water work between July 15 and August 31.
- Place all in-water structures to ensure that they do not inhibit passage of bull trout.
- Minimize the potential for sedimentation associated with project construction and operation.
- Minimize the potential for chemical pollution associated with project construction and operation.
- Minimize potential for take associated with installation and operation of new fish screen (designed to keep fish out of irrigation channels).
- Ensure that fish screen meets NMFS acceptance standards for mortality or injury of juvenile salmonids.
- Conservation recommendation: study newly created habitat and minimize use of non-native plants for revegetation.

### Oregon CREP terms and conditions

- Develop comprehensive monitoring program to assess effectiveness of the CREP.
- Avoid take of listed fish in wetland restoration activities.
- Manage herbicides and pesticides to ensure that no degradation of water quality occurs.
- Location, design, and maintain livestock crossings as necessary to minimize degradation of riparian and aquatic habitats.
- Minimize take associated with instream work by applying appropriate timing restrictions.

## **MINING PROJECT MODIFICATIONS**

- Investigate an alternative crossing.
- Insure that mine operator does not use the ford between August 31 and April 1.
- Provide an annual activity report.
- Provide educational materials to the miner that describe the bull trout life history, including redd formation and timing of spawning, and an identification key.

## **“OTHER” PROJECT MODIFICATIONS**

### Channel improvements (Columbia River dredging) terms and conditions

- Minimize entrainment by: implementing dredging Impact Minimization Measures, monitoring dredge draghead and/or cutterhead to minimize the time they are removed from the substrate, monitor blasting to check for fish take, provide contractor compliance plan prior to construction.
- Institute monitoring program.
- Develop contaminant testing protocols.
- Develop plan to reduce fish stranding by vessel traffic (give plan to Coast Guard).
- Use in-water construction windows for construction (including excavation and dredge material placement) and ecosystem restoration.
- Minimize contaminant resuspension from temporary storage of dredge material.
- Record daily operations when dredging and submit monitoring reports to the Service, including Integrated Annual Report.

### Stream restoration terms and conditions

- Limit duration and extent of in-water construction activities, and time projects to avoid effects.
- Provide passage for adult and juvenile forms of all salmonid species.
- All in-water work will be completed between July 1 and July 31.
- Minimize disturbance of streambank and riparian vegetation.
- Minimize amount of riprap.
- Water withdrawals comply with all state and Federal laws.
- Erosion control measures include: erosion control blankets, straw for temporary erosion control, replanting with native shrubs, inspect erosion control devices regularly.
- Pollution control measures include: filter sediment-laden water, conserve topsoil, clean equipment used for instream work prior to use, prevent construction debris from falling into stream, develop pollution control plan, locate fuel storage, refueling, and servicing areas above 10 year floodplain of any waterbody, no surface application of nitrogen fertilizer.
- Protect riparian habitat by clearly marking boundaries, minimizing alteration of native vegetation (clip by hand to leave roots intact), replace riparian understory and overstory vegetation.
- Make sure fish are not stranded in old channel by using diversion structures and sequenced dewatering; physically move fish into the new channel.
- Monitor all measures and provide report.

### Integrated noxious weed management terms and conditions

- No adjuvant will be added to any aquatic-approved herbicide without the adjuvant also being labeled as approved for aquatic use by the EPA.
- Educate herbicide applicators regarding BMPs.
- Determine level of concern of herbicide prior to use if there is insufficient data to complete a risk assessment.
- Provide new information on herbicide and adjuvant toxicity to the Service annually.
- Provide report of proposed weed control activities and monitoring report yearly.

### Resource management terms and conditions

- None.
- Conservation recommendations: cooperate with BOR and tribes to evaluate losses of bull trout at Agency Dams and develop remedies to preclude/offset those losses; review and implement Service’s draft Recovery Plan for bull trout.

### Intra-service consultation terms and conditions

- Ensure that only qualified individuals conduct bull trout restoration.
- Require permit applicants to provide a clear description of requested activities.
- Require permittees to provide an annual report of activities.

## APPENDIX E

### Length (streams) and area (lakes) of proposed designated bull trout critical habitat that is within U.S. Forest Service Land and Forest Service Wilderness Areas

Length of Proposed Bull Trout Critical Habitat Streams that are within U.S. Forest Service Lands*		
Critical Habitat Unit	Kilometers	Miles
Clark Fork River Basin	2,707.6	1,682.4
Clearwater River Basin	2,516.7	1,563.8
Coeur d'Alene Lake Basin	425.7	264.5
Deschutes River Basin	236.0	146.6
Grande Ronde River Basin	506.2	314.5
Hells Canyon Complex	422.0	262.2
Hood River Basin	76.5	47.6
Imnaha-Snake River Basins	156.6	97.3
John Day River Basin	507.7	315.5
Klamath River Basin	213.1	132.4
Kootenai River Basin	226.0	140.4
Little Lost River Basin	71.8	44.6
Lower Columbia River Basin	52.9	32.9
Malheur River Basin	227.4	141.3
Middle Columbia River Basin	354.3	220.2
Northeast Washington River Basins	170.3	105.8
Odell Lake	23.8	14.8
Salmon River Basin	5,445.7	3,383.8
Snake River	80.4	49.9
Snake River Basin in Washington	152.9	95.0
Southwest Idaho River Basins	2,068.7	1,285.4
Umatilla-Walla Walla River Basins	199.0	123.6
Upper Columbia River Basin	567.2	352.5
Willamette River Basin	143.8	89.3
<b>TOTAL</b>	<b>17,552.1</b>	<b>10,906.3</b>

Note: Some reaches of the Columbia River mainstem within Columbia River Basin unit may border national forest lands. However, the Proposed Rule does not describe adjacent land managed by the USFS in this unit.

Area of Proposed Bull Trout Critical Habitat Lakes/Reservoirs that are within U.S. Forest Service Lands*		
Critical Habitat Unit	Hectares	Acres
Clark Fork River Basin	10,510.0	25,970.9
Clearwater River Basin	24.3	60.1
Deschutes River Basin	3,471.5	8,578.3
Hood River Basin	36.9	91.1
Klamath River Basin	37.5	92.7
Kootenai River Basin	18.1	44.8
Lower Columbia River Basin	10.6	26.2
Middle Columbia River Basin	1,706.9	4,218.0
Northeast Washington River Basins	517.4	1,278.6
Odell Lake	2,605.9	6,439.3
Salmon River Basin	1,395.3	3,448.0
Southwest Idaho River Basins	360.0	889.5
Upper Columbia River Basin	67.8	167.4
Willamette River Basin	23.9	59.1
<b>TOTAL</b>	<b>20,786.3</b>	<b>51,364.0</b>

Note: Some reaches of the Columbia River mainstem within Columbia River Basin unit may border national forest lands. However, the Proposed Rule does not describe adjacent land managed by the USFS in this unit.

Length of Proposed Bull Trout Critical Habitat Streams that are within Designated Wilderness Areas*		
Critical Habitat Unit	Kilometers	Miles
Clark Fork River Basin	511.9	318.1
Clearwater River Basin	737.5	458.3
Deschutes River Basin	22.2	13.8
Grande Ronde River Basin	245.7	152.7
Hells Canyon Complex	31.8	19.8
Hood River Basin	4.0	2.5
Imnaha-Snake River Basins	71.4	44.4
John Day River Basin	134.9	83.8
Klamath River Basin	42.1	26.2
Kootenai River Basin	3.9	2.5
Malheur River Basin	27.9	17.4
Middle Columbia River Basin	98.2	61.0
Northeast Washington River Basins	3.4	2.1
Odell Lake	9.8	6.1
Salmon River Basin	1,890.5	1,174.7
Snake River	31.7	19.7
Snake River Basin in Washington	21.2	13.2
Southwest Idaho River Basins	158.1	98.2
Umatilla-Walla Walla River Basins	25.9	16.1
Upper Columbia River Basin	145.8	90.6
Willamette River Basin	6.6	4.1
<b>TOTAL</b>	<b>4,224.5</b>	<b>2,625.</b>

Area of Proposed Bull Trout Critical Habitat Lakes/Reservoirs that are within Designated Wilderness Areas*		
Critical Habitat Unit	Hectares	Acres
Clark Fork River Basin	415.8	1,027.3
Clearwater River Basin	22.2	54.9
Upper Columbus River Basin	46.4	114.7
<b>TOTAL</b>	<b>484.4</b>	<b>1,196.9</b>

Source: Provided by U.S. Fish and Wildlife Service, Portland.

\* The figures in the above tables were derived from overlaying proposed Bull Trout Critical Habitat streams and lakes/reservoirs data with the following data layers:

- 1:100,000 scale land “Ownership” layers created in support of the Interior Columbia Basin Ecosystem Monitoring Program (ICBEMP) were used to define boundaries of public lands administered by the U.S. Forest Service in Washington, Oregon and Idaho.
- 1:100,000/1:500,000 scale “Wilderness” layer created in support of the ICBEMP was used to define boundaries of public lands designated as Wilderness Areas in Washington, Oregon and Idaho.
- 1:100,000 scale “Public Land Ownership and Managed Lands of Montana” layer created by the Montana Natural Heritage Program was used to define boundaries of public lands administered by the U.S. Forest Service as well as those designated as Wilderness Areas.

These figures should be used with the following caveats:

- The process of overlaying digital data from various sources can generate measurement error, mainly along edges of physical features. For example, a stream channel may be designated as the boundary of a particular land use designation, such as a Wilderness Area. When overlaying the digital representation of the stream channel and the Wilderness Area boundary, however, these may not be identical features. This source of error is also inherent in area calculations for lakes and reservoirs that border USFS lands and Wilderness Areas.
- In some cases, stream channels (especially for larger rivers), where delineated as polygon features, separate from the land ownership designation on either side of the channel. In cases where land ownership on both sides of such streams was “USFS” or “Wilderness Area”, these streams (or portions of streams) were included in the appropriate length figures in the above tables.
- Likewise, lakes and reservoirs were often identified as “Water” polygons in the land ownership layers. If these polygons were entirely contained within USFS lands or Wilderness Areas, these features were included in the appropriate area figures in the above tables.
- The ICBEMP data sets (used for Washington, Oregon and Idaho) identified Federally owned wilderness areas, and of these areas that intersected proposed bull trout critical habitat, all were administered by the USFS. The Montana data set, on the other hand, also identified Wilderness Areas on Tribal lands. One such area exists west of the Mission Mountains Wilderness on lands of the Salish and Kootenai tribes. This area was considered in the final figures presented in the above tables, however, it accounts for only 3.7 km (2.3 miles) and 1.0 hectares (2.5 acres) of proposed bull trout critical habitat on wilderness area lands. The remainder of the wilderness areas identified in the Montana data set were administered by USFS.

## **APPENDIX F**

### **Breakdown of the Co-Extensive Costs of the Designation by Proposed Critical Habitat Unit**

#### **F.1 Introduction**

1. As noted in Section 1 of this report, Section 4(b)(2) of the Endangered Species Act (the Act) requires the Service to designate critical habitat on the basis of the best scientific data available, after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Service may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species. The purpose of this appendix is to provide an allocation of the aggregate costs estimated in this report among the 25 proposed bull trout critical habitat units.
2. As is detailed below, there is uncertainty associated with both the magnitude and the location of some estimated future bull trout consultation-related costs. Certain estimated costs are easily assigned to specific proposed critical habitat units (such as dam-related consultations where the location of the dams in question are known). For other categories of costs, however, there is less certainty as to where within the range of the bull trout designation the costs will occur. Despite these uncertainties, the following analysis provides an allocation of estimated costs across proposed critical habitat units. Where no allocation can be made, or where an allocation has a significant degree of uncertainty associated with it, such limitations are noted.

#### **F.2 Allocation of Consultation Costs by Unit**

3. Section 4 of this report details the estimation of total annual costs associated with the preparation of section 7 bull trout consultations. Exhibit 4.1 presents the aggregate estimate of anticipated annual section 7 consultation related costs (exclusive of any additional forecast project modification costs). In order to allocate these costs to specific proposed units, the incidence of future formal consultations was assumed to follow the pattern of past formal consultation activity for the species.<sup>1</sup> Exhibit F.1 shows the percentage distribution of future formal consultations across critical habitat units and allocates the total estimated formal consultation-related costs to the Service, Action agencies and private applicants.

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<sup>1</sup> The past consultation record includes consultations throughout the proposed designation for the species from listing in 1998 through November, 2002. This consultation record was augmented with information on ongoing consultation activities that might not be represented by the consultation record examined.

4. Additionally, Exhibit F.1 shows estimated informal consultation costs by unit. Estimates of future informal consultations were derived from the unit's share of field office formal consultations. For example, 40 formal bull trout consultations took place within the Portland office during the period examined. Ten of these formal consultations, or 25 percent, took place on projects located in the Hood River Basin. Given 15 informal bull trout consultations per year projected for the Portland office, the Hood River Basin is expected to see  $(0.25) \times 15$ , or 3.75 informal consultations annually. The unit informal consultation costs were then converted to a percentage of all informal consultations. The Hood River Basin represents 3.75 of 619 projected informal consultations across all units, or approximately 0.61 percent. Multiplying the unit share of all informal consultations (0.0061) by the estimated total annual cost of all informal consultations within the designation (\$5,881,000) yields an estimated annual informal consultation cost estimate for the Hood River Unit of \$36,000, after rounding to the nearest thousand.
5. The methodology used for allocating informal consultation activity reported by a field office among the critical habitat units within that office's jurisdiction has the potential for bias. Specifically, some offices have a large number of informal consultations and a relatively small number of formal consultations. In these cases, a large number of informal consultations (and associated consultation-related costs) may be allocated to a unit based on a relatively small sample of formal consultations. In cases where a significant share of total estimated costs associated with a specific unit are accounted for by predicted informal consultation costs, care should be taken in interpreting those estimates.

<b>Exhibit F.1</b>					
<b>Estimated Annual Formal and Informal Section 7 Consultation Costs by Proposed Critical Habitat Unit (Thousands \$)</b>					
<b>Unit</b>	<b>Unit Name</b>	<b>Percent of Formal Consultations</b>	<b>Formal Consultation Costs</b>	<b>Informal Consultation Costs</b>	<b>Total Consultation Costs</b>
1	Klamath River Basin	4.0%	\$100	\$19	\$119
2	Clark Fork River Basin	19.3%	\$488	\$321	\$809
3	Kootenai River Basin	6.9%	\$175	\$115	\$290
4	Willamette River Basin	3.0%	\$75	\$21	\$96
5	Hood River Basin	5.0%	\$125	\$36	\$161
6	Deschutes River Basin	2.0%	\$50	\$14	\$64
7	Odell Lake	1.5%	\$38	\$11	\$49
8	John Day River Basin	6.9%	\$175	\$50	\$225
9	Umatilla-Walla Walla River Basins	1.5%	\$38	\$11	\$49
10	Grande Ronde River Basin	2.5%	\$63	\$325	\$388
11	Imnaha/Snake River Basins	3.5%	\$88	\$456	\$544
12	Hells Canyon Complex	3.0%	\$75	\$672	\$747
13	Malheur River Basin	5.5%	\$138	\$1,232	\$1,370
14	Couder d'Alene Lake Basin	1.0%	\$25	\$130	\$155
15	Clearwater River Basin	2.0%	\$50	\$448	\$498
16	Salmon River Basin	5.0%	\$125	\$1,121	\$1,246
17	Southwest Idaho River Basins	1.0%	\$25	\$224	\$249
18	Little Lost River Basin	0.5%	\$13	\$112	\$125
19	Lower Columbia River Basin	5.5%	\$138	\$105	\$243
20	Middle Columbia Basin	1.0%	\$25	\$19	\$44
21	Upper Columbia Basin	2.5%	\$63	\$48	\$111
22	Northeast Washington River Basins	2.0%	\$50	\$261	\$311
23	Snake River Basin in Washington	1.0%	\$25	\$130	\$155
24	Columbia River	2.0%	\$50	--	\$50
25	Snake River	4.0%	\$100	--	\$100
Multiple Unit or Unknown Area		8.4%	\$213	--	\$213
Total		100.0%	\$2,526	\$5,881	\$8,407

### **F.3     Allocation of Unit-by-Unit Project Modification Costs**

6.            The second major component of anticipated costs associated with future section 7 consultations involving the bull trout are costs associated with project modifications resulting from the formal consultation process. In this analysis aggregate predicted annual project modification costs are examined and presented by associated Action agency and activity. These estimates are then allocated to each proposed critical habitat unit.
7.            In the case of a number of relatively large classes of predicted project modification costs, unit allocation is a straightforward process. For example, there are significant annual project modification cost estimates associated with ACOE and BOR dam consultations in the Yakima and Willamette River Basins. These estimated costs are clearly assignable to the Middle Columbia and Willamette River Units, respectively. Other costs that were estimated across the designation are not as clearly assigned on a unit level. In these cases (such as FHWA costs and BLM grazing costs) additional information is utilized to allocate estimated costs.
8.            In the following discussion, project modification costs are addressed for each Action agency and activity, and estimates of these costs are presented on a critical habitat unit level. Where significant uncertainty exists as to the distribution of estimated costs across units, this uncertainty is noted and implications of associated errors discussed.

#### **F.3.1     U.S. Army Corps of Engineers**

9.            Two specific classes of project modification costs associated with ACOE section 7 bull trout consultations were identified: (1) dam and reservoir operations, and (2) bank stabilization, bridge replacement and stream restoration projects. In the case of forecast annual costs associated with dam and reservoir operations, these costs are specific to the Willamette River Drainage critical habitat unit (as discussed in Section 4). All of these costs (\$3,290,000 to \$3,490,000 annually) result from expected modifications and ongoing costs associated with section 7 bull trout consultations on 13 ACOE impoundments on the Upper Willamette River.
10.           The estimated costs associated with bank stabilization, bridge replacement and stream restoration (estimated at \$40,000/year) have been allocated across all critical habitat units based on the number of stream miles within each unit. One adjustment was made to this allocation. The number miles of streams within designated wilderness areas was subtracted from the total number of river and stream miles within a unit. This adjustment was made because project modifications within wilderness areas are not expected.
11.           On a unit basis, project modification costs for bank stabilization, bridge replacement and stream restoration rarely exceed \$2,000 per year. The Clark Fork Unit (\$7,000 annually) and Salmon River Basin Unit (\$9,000 annually) are the critical habitat units with the highest levels of these predicted costs.

Exhibit F.2				
Estimated Annual Project Modification Costs Associated With Army Corps of Engineers (Thousands \$)				
Unit #	Unit Name	Project Modification Costs		
		Dam Modifications		Bank stabilization, Bridge Replacement and Stream Restoration
		Low	High	
1	Klamath River Basin	-		< \$1
2	Clark Fork River Basin	-		\$7
3	Kootenai River Basin	-		< \$1
4	Willamette River Basin	\$3,290	\$3,490	< \$1
5	Hood River Basin	-		< \$1
6	Deschutes River Basin	-		\$1
7	Odell Lake	-		< \$1
8	John Day River Basin	-		\$1
9	Umatilla-Walla Walla River Basins	-		< \$1
10	Grande Ronde River Basin	-		\$1
11	Imnaha/Snake River Basins	-		< \$1
12	Hells Canyon Complex	-		\$1
13	Malheur River Basin	-		< \$1
14	Couer d'Alene Lake Basin	-		\$2
15	Clearwater River Basin	-		\$3
16	Salmon River Basin	-		\$9
17	Southwest Idaho River Basins	-		\$4
18	Little Lost River Basin	-		< \$1
19	Lower Columbia River Basin	-		< \$1
20	Middle Columbia Basin	-		\$1
21	Upper Columbia Basin	-		\$1
22	Northeast Washington River Basins	-		< \$1
23	Snake River Basin in Washington	-		< \$1
24	Columbia River	-		\$1
25	Snake River	-		< \$1
	Total	\$3,290	\$3,490	\$40*
*Note: Total reflects sum of non-rounded project modification cost estimates.				

### **F.3.2            Bureau of Land Management**

12.            The primary project modification costs resulting from BLM consultations with the Service are associated with conditions and requirements for grazing leases on BLM lands. These costs, estimated at \$30,000 per year, have been allocated across the proposed critical habitat units based on the estimated share of total BLM land within each proposed unit.
  
13.            BLM grazing costs for the bull trout are fairly minimal at the critical habitat unit level. Of the 25 proposed critical habitat units for the bull trout, only five units have project modification costs expected to exceed \$1,000 annually. By far, the largest project modification cost estimate associated with BLM consultations occurs in the Salmon River Basin (\$14,000 annually).

<b>Exhibit F.3</b> <b>Estimated Annual Project Modification Costs Associated with Bureau of Land Management</b> <b>(Thousand \$)</b>		
<b>Unit #</b>	<b>Unit Name</b>	<b>Project Modification Costs Grazing Leases</b>
1	Klamath River Basin	< \$1
2	Clark Fork River Basin	< \$1
3	Kootenai River Basin	< \$1
4	Willamette River Basin	< \$1
5	Hood River Basin	< \$1
6	Deschutes River Basin	< \$1
7	Odell Lake	\$0
8	John Day River Basin	\$2
9	Umatilla-Walla Walla River Basins	< \$1
10	Grande Ronde River Basin	< \$1
11	Imnaha/Snake River Basins	< \$1
12	Hells Canyon Complex	\$2
13	Malheur River Basin	\$3
14	Couer d'Alene Lake Basin	< \$1
15	Clearwater River Basin	< \$1
16	Salmon River Basin	\$14
17	Southwest Idaho River Basins	\$4
18	Little Lost River Basin	\$1
19	Lower Columbia River Basin	< \$1
20	Middle Columbia Basin	< \$1
21	Upper Columbia Basin	< \$1
22	Northeast Washington River Basins	< \$1
23	Snake River Basin in Washington	< \$1
24	Columbia River	\$0
25	Snake River	\$0
	Total	\$30*
*Note: Total reflects sum of non-rounded project modification cost estimates.		

### **F.3.3 Bonneville Power Administration**

14. The primary project modification costs results from Bonneville Power Administration consultations with the Service are associated with conditions and requirements for the Federal Columbia River Power System (FCRPS). Other BPA project modification costs are associated with fisheries and habitat restoration. These costs are expected to range between \$10,000 and \$40,000 per year. The estimated annual BPA-related costs are allocated across the proposed critical habitat units based on the share of stream kilometers found within each proposed unit. One adjustment was made to this allocation. The kilometers of streams within designated wilderness areas were subtracted from the total number of river and stream miles within a unit. This adjustment was made because project modifications within wilderness areas are not expected.
15. It is estimated that annual BPA costs associated with section 7 consultation with the FCRPS involving the bull trout and its proposed critical habitat will cost between zero and \$1.9 million. These estimated costs have been allocated among units based on actual past years' allocation of bull trout-related costs incurred by BPA. This allocation places roughly 10 percent of predicted costs within the Columbia River Unit, 29 percent within the Upper Columbia Unit, 25 percent within the Clark Fork Unit, and 36 percent within the Imnaha, Grand Ronde, and Walla Walla/Umatilla Units.
16. At the unit level, high-end annual estimated project modification cost estimates for BPA fisheries and habitat restoration are typically less than \$1,500. The highest forecast project modification costs occur in the Clark Fork Unit (\$7,000) and Salmon River Basin Unit (\$9,000).

Exhibit F.4				
Estimated Annual Project Modification Costs Associated With Bonneville Power Administration (Thousands \$)				
Unit #	Unit Name	Project Modification Costs		
		FCRPS	Fisheries, Restoration	
			Low End	High End
1	Klamath River Basin	\$0	< \$1	< \$1
2	Clark Fork River Basin	\$0 - \$97	\$2	\$7
3	Kootenai River Basin	\$0	< \$1	< \$1
4	Willamette River Basin	\$0	< \$1	< \$1
5	Hood River Basin	\$0	< \$1	< \$1
6	Deschutes River Basin	\$0	< \$1	\$1
7	Odell Lake	\$0	< \$1	<\$1
8	John Day River Basin	\$0	< \$1	\$1
9	Umatilla-Walla Walla River Basins	\$0 - \$36	< \$1	< \$1
10	Grande Ronde River Basin	\$0 - \$18	< \$1	\$1
11	Imnaha/Snake River Basins	\$0 - \$18	< \$1	< \$1
12	Hells Canyon Complex	\$0	< \$1	\$1
13	Malheur River Basin	\$0	< \$1	< \$1
14	Couer d' Alene Lake Basin	\$0	< \$1	\$2
15	Clearwater River Basin	\$0	< \$1	\$3
16	Salmon River Basin	\$0	\$2	\$9
17	Southwest Idaho River Basins	\$0	< \$1	\$4
18	Little Lost River Basin	\$0	< \$1	< \$1
19	Lower Columbia River Basin	\$0	< \$1	< \$1
20	Middle Columbia Basin	\$0	< \$1	\$1
21	Upper Columbia Basin	\$0 - \$141	< \$1	\$1
22	Northeast Washington River Basins	\$0	< \$1	< \$1
23	Snake River Basin in Washington	\$0	< \$1	< \$1
24	Columbia River	\$0 - \$56	< \$1	\$1
25	Snake River	\$0	< \$1	< \$1
	Total	\$0 - \$366	\$10*	\$40*
*Note: Totals reflect sum of non-rounded project modification cost estimates.				

#### **F.3.4        Bureau of Reclamation**

17.        As presented in Section 4, cost estimates associated with project modifications resulting from section 7 bull trout consultations between the Service and BOR are specific to individual BOR facilities. Exhibit F.5 shows the allocation of total estimated annual bull trout-related project modification costs on a unit-by-unit basis.
  
18.        The largest share of these project modification costs (\$4,230,000 to \$4,380,000 annually) are associated with the Middle Columbia River Basin critical habitat unit. These are estimated annual project modification costs to BOR impoundments on the Yakima River System. Other units with significant forecast costs are the Southwest Idaho River Basins Unit (\$690,000 annually), the Deschutes River Basin and the Hells Canyon Complex Units (\$200,000 annually apiece) and the Malheur River Basin Unit (\$140,000 annually).

Exhibit F.5			
Estimated Annual Project Modification Costs Associated With Bureau of Reclamation (Thousands \$)			
Unit #	Unit Name	Project Modification Costs Irrigation, Dam, and Reservoir Operations	
		Low End	High End
1	Klamath River Basin	-	-
2	Clark Fork River Basin	-	-
3	Kootenai River Basin	-	-
4	Willamette River Basin	-	-
5	Hood River Basin	-	-
6	Deschutes River Basin	\$200	\$200
7	Odell Lake	-	-
8	John Day River Basin	-	-
9	Umatilla-Walla Walla River Basins	-	-
10	Grande Ronde River Basin	-	-
11	Imnaha/Snake River Basins	-	-
12	Hells Canyon Complex	\$200	\$200
13	Malheur River Basin	\$140	\$140
14	Couer d'Alene Lake Basin	-	-
15	Clearwater River Basin	-	-
16	Salmon River Basin	-	-
17	Southwest Idaho River Basins	\$690	\$690
18	Little Lost River Basin	-	-
19	Lower Columbia River Basin	-	-
20	Middle Columbia Basin	\$4,230	\$4,380
21	Upper Columbia Basin	-	-
22	Northeast Washington River Basins	-	-
23	Snake River Basin in Washington	-	-
24	Columbia River	-	-
25	Snake River	-	-
	Total	\$5,430	\$5,610

### **F.3.5            Federal Highway Administration**

19.            The primary project modification costs resulting from Federal Highway Administration consultations with the Service are associated with bridge construction and maintenance. These costs, estimated at \$250,000 per year, are allocated across the proposed critical habitat units based on the share of stream kilometers found within each proposed unit. One adjustment was made to this allocation. The kilometers of streams within designated wilderness areas were subtracted from the total number of river and stream miles within a unit. This adjustment was made because project modifications within wilderness areas are not expected.
  
20.            Although project modification cost estimates for the FHWA are fairly low when distributed by unit, several critical habitat units stand out; specifically, the Clark Fork River Basin (\$45,000), the Couer d'Alene Lake Basin (\$12,000), the Clearwater River Basin (\$21,000), the Salmon River Basin (\$53,000) and the Southwest Idaho River Basins (\$23,000).

<b>Exhibit F.6</b> <b>Estimated Annual Project Modification Costs Associated With Federal Highway Administration</b> <b>(Thousands \$)</b>		
<b>Unit #</b>	<b>Unit Name</b>	<b>Project Modification Costs</b>
1	Klamath River Basin	\$4
2	Clark Fork River Basin	\$45
3	Kootenai River Basin	\$5
4	Willamette River Basin	\$3
5	Hood River Basin	\$2
6	Deschutes River Basin	\$7
7	Odell Lake	< \$1
8	John Day River Basin	\$9
9	Umatilla-Walla Walla River Basins	\$6
10	Grande Ronde River Basin	\$7
11	Imnaha/Snake River Basins	\$2
12	Hells Canyon Complex	\$9
13	Malheur River Basin	\$3
14	Couer d'Alene Lake Basin	\$12
15	Clearwater River Basin	\$21
16	Salmon River Basin	\$53
17	Southwest Idaho River Basins	\$24
18	Little Lost River Basin	\$2
19	Lower Columbia River Basin	\$3
20	Middle Columbia Basin	\$7
21	Upper Columbia Basin	\$7
22	Northeast Washington River Basins	\$3
23	Snake River Basin in Washington	\$3
24	Columbia River	\$8
25	Snake River	\$5
	Total	\$250*
*Note: Total represents sum of non-rounded project modification estimates.		

### **F.3.6            Federal Energy Regulatory Commission**

21.            For project modifications resulting from FERC consultations, this analysis uses information from specific dams where future section 7 consultations will take place. Bull trout consultations generally coincide with the dam re-licensing process. To estimate project modification costs, the actual re-license date was used in discounting future costs to present. Table F.7a provides estimates based on a seven percent rate, and Table F.7b presents estimates based on a three percent rate. The highest cost estimates are associated with critical habitat units with significant damming, such as the Columbia River (with high end annual cost estimates of \$362,000 and \$218,000, using rates of seven and three percent, respectively).

Exhibit F.7a			
Estimated Annual Project Modification Costs Associated With Federal Energy Regulation Commission Seven Percent Discount Rate (Thousands \$)			
Unit	Unit Name	Section 7 Bull Trout-Related Costs	
		Low	High
1	Klamath River Basin	< \$1	< \$1
2	Clark Fork River Basin	\$50	\$91
3	Kootenai River Basin	\$0	\$0
4	Willamette River Basin	\$80	\$111
5	Hood River Basin	\$14	\$38
6	Deschutes River Basin	\$129	\$177
7	Odell Lake	\$0	\$0
8	John Day River Basin	\$0	\$0
9	Umatilla-Walla Walla Rivers	< \$1	< \$1
10	Grande Ronde River Basin	\$0	\$0
11	Imnaha/Snake River	\$0	\$0
12	Hells Canyon Complex	\$99	\$135
13	Malheur River Basin	\$0	\$0
14	Couder d'Alene Lake Basin	\$0	\$0
15	Clearwater River Basin	< \$1	< \$1
16	Salmon River Basin	< \$1	< \$1
17	Southwest Idaho Rivers	\$24	\$36
18	Little Lost River Basin	\$0	\$0
19	Lower Columbia River Basin	\$90	\$123
20	Middle Columbia Basin	\$1	\$3
21	Upper Columbia Basin	\$0	\$0
22	N.E. Wash. River Basins	\$183	\$248
23	Snake River Basin in Wash.	\$0	\$0
24	Columbia River	\$265	\$362
25	Snake River	\$0	\$0
Total		\$939	\$1,328

Exhibit F.7b			
Estimated Annual Project Modification Costs Associated With Federal Energy Regulation Commission Three Percent Discount Rate (Thousands \$)			
Unit	Unit Name	Section 7 Bull Trout-Related Costs	
		Low	High
1	Klamath River Basin	< \$1	<\$1
2	Clark Fork River Basin	\$56	\$77
3	Kootenai River Basin	\$0	\$0
4	Willamette River Basin	\$54	\$69
5	Hood River Basin	\$14	\$22
6	Deschutes River Basin	\$67	\$84
7	Odell Lake	\$0	\$0
8	John Day River Basin	\$0	\$0
9	Umatilla-Walla Walla Rivers	< \$1	<\$1
10	Grande Ronde River Basin	\$0	\$0
11	Imnaha/Snake River	\$0	\$0
12	Hells Canyon Complex	\$57	\$72
13	Malheur River Basin	\$0	\$0
14	Couer d' Alene Lake Basin	\$0	\$0
15	Clearwater River Basin	<\$1	<\$1
16	Salmon River Basin	< \$1	< \$1
17	Southwest Idaho Rivers	\$33	\$44
18	Little Lost River Basin	\$0	\$0
19	Lower Columbia River Basin	\$53	\$66
20	Middle Columbia Basin	\$4	\$6
21	Upper Columbia Basin	\$0	\$0
22	N.E. Wash. River Basins	\$106	\$132
23	Snake River Basin in Wash.	\$0	\$0
24	Columbia River	\$174	\$218
25	Snake River	\$0	\$0
Total		\$622	\$794

### **F.3.7 U. S. Forest Service**

22. Project modification costs forecast to result from U.S. Forest Service consultations with the Service fall under five categories: (1) timber harvest, (2) grazing, (3) mining, (4) forest and road management and (5) irrigation diversions. For all proposed critical habitat units, timber harvest costs range between \$1,640,000 and \$4,140,000 per year, grazing costs are estimated as \$100,000 per year, mining costs are expected to be \$530,000 per year, forest and road maintenance is expected to cost between \$0 and \$230,000 per year, and irrigation diversions are expected to cost between \$0 and \$1,687,000. These costs are all allocated across the proposed critical habitat units based on the share of all Forest Service controlled stream kilometers found within each proposed unit. One adjustment was made to this allocation. The kilometers of streams within designated wilderness areas were subtracted from the total number of river and stream miles within a unit. This adjustment was made because project modifications within wilderness areas are not expected.
23. High end project modification cost forecasts associated with timber harvest exceed \$500,000 in several units: the Clark Fork River Basin (\$682,000), the Clearwater River Basin (\$553,000), the Salmon River Basin (\$1,104,000), and the Southwest Idaho River Basin (\$593,000) critical habitat units.
24. The majority (17) of unit project modification cost estimates for grazing are less than \$2,000. The Clark Fork River Basin (\$16,000), the Clearwater River Basin (\$13,000), the Salmon River Basin (\$27,000), and the Southwest Idaho River Basins (\$14,000) are forecast to experience relatively high project modification costs associated with grazing on Forest Service land.
25. The analysis identifies four specific critical habitat units where section 7 compliance affects mining activity on Forest Service land. Project modification cost estimates come to \$100,000 for the Clark Fork River Basin, \$220,000 for the John Day River Basin, \$110,000 for the Hells Canyon Complex, and \$100,000 for the Clearwater River Basin.
26. Project modification cost estimates for road maintenance and forest management are less than \$5,000 in 17 of the 25 critical habitat units. The Clark Fork River Basin (\$38,000), the Clearwater River Basin (\$31,000), the Salmon River Basin (\$61,000), and the Southwest Idaho River Basins (\$33,000) are forecast to experience relatively high project modification costs associated with road maintenance and forest management.
27. The same four critical habitat units are forecast to experience high project modification costs associated with irrigation diversions. The high end annual irrigation diversion cost estimates reach \$278,000 for the Clark Fork River Basin, \$225,000 for the Clearwater River Basin, \$450,000 for the Salmon River Basin, and \$242,000 for the Southwest Idaho River Basins.

**Exhibit F.8**

**Estimated Annual Project Modification Costs Associated With U.S. Forest Service  
(Thousands \$)**

#	Unit Name	Project Modification Costs							
		Timber		Grazing	Mining	Road and Forest Management		Irrigation Diversions	
		Low	High			Low	High	Low	High
1	Klamath River	\$21	\$53	\$1	-	\$0	\$3	\$0	\$22
2	Clark Fork River	\$270	\$682	\$16	\$100	\$0	\$38	\$0	\$278
3	Kootenai River	\$27	\$69	\$2	-	\$0	\$4	\$0	\$28
4	Willamette River	\$17	\$43	\$1	-	\$0	\$2	\$0	\$17
5	Hood River	\$9	\$23	< \$1	-	\$0	\$1	\$0	\$9
6	Deschutes River	\$26	\$66	\$2	-	\$0	\$4	\$0	\$27
7	Odell Lake	\$2	\$4	< \$1	-	\$0	< \$1	\$0	\$2
8	John Day River	\$46	\$116	\$3	\$220	\$0	\$6	\$0	\$47
9	Umatilla-Walla River	\$21	\$54	\$1	-	\$0	\$3	\$0	\$22
10	Grande Ronde River	\$32	\$81	\$2	-	\$0	\$4	\$0	\$33
11	Imnaha/Snake River	\$10	\$26	< \$1	-	\$0	\$1	\$0	\$11
12	Hells Canyon	\$48	\$121	\$3	\$110	\$0	\$7	\$0	\$49
13	Malheur River	\$25	\$62	\$1	-	\$0	\$3	\$0	\$25
14	CDA Lake	\$52	\$132	\$3	-	\$0	\$7	\$0	\$54
15	Clearwater River	\$219	\$553	\$13	\$100	\$0	\$31	\$0	\$225
16	Salmon River	\$437	\$1,104	\$27	-	\$0	\$61	\$0	\$450
17	Southwest Idaho River	\$235	\$593	\$14	-	\$0	\$33	\$0	\$242
18	Little Lost River	\$9	\$22	< \$1	-	\$0	\$1	\$0	\$9
19	Lower Columbia	\$7	\$16	< \$1	-	\$0	< \$1	\$0	\$7
20	Middle Columbia	\$32	\$80	\$2	-	\$0	\$4	\$0	\$32
21	Upper Columbia	\$52	\$131	\$3	-	\$0	\$7	\$0	\$53
22	Northeast Washington	\$21	\$52	\$1	-	\$0	\$3	\$0	\$21
23	Snake River Washington	\$16	\$41	< \$1	-	\$0	\$2	\$0	\$17
24	Columbia River	\$6	\$15	< \$1	-	\$0	< \$1	\$0	\$6
25	Snake River	\$0	\$0	\$0	-	\$0	\$0	\$0	\$0
	Total	\$1,640	\$4,139	100*	\$530	\$0	\$230*	\$0	\$1,686

\*Note: Totals reflect non-rounded sums of project modification estimates.

### **F.3.8 Other Agencies**

28. Additional project modification costs are forecast to be associated with consultations between Bureau of Indian Affairs, National Park Service, Fish and Wildlife Service, U.S. Geological Survey, U.S. Department of Agriculture and National Oceanic and Atmospheric Administration and the Service. These are forecast to be, in total, \$110,000 per year. These costs are allocated across the proposed critical habitat units based on the share of stream kilometers found within each proposed unit. One adjustment was made to this allocation. The kilometers of streams within designated wilderness areas were subtracted from the total number of river and stream miles within a unit. This adjustment was made project modifications within wilderness areas are not expected. Once again the unit cost allocation forecasts the highest costs to occur in the Clark Fork (\$20,000) and Salmon (\$24,000) River Basins.

<b>Exhibit F.9</b> <b>Estimated Annual Project Modification Costs Associated with Other Action Agencies (BIA, NPS, FWS, USGS, USDA, NOAA) (Thousands \$)</b>		
<b>Unit #</b>	<b>Unit Name</b>	<b>Project Modification Costs</b>
1	Klamath River Basin	\$2
2	Clark Fork River Basin	\$20
3	Kootenai River Basin	\$2
4	Willamette River Basin	\$1
5	Hood River Basin	< \$1
6	Deschutes River Basin	\$3
7	Odell Lake	< \$1
8	John Day River Basin	\$4
9	Umatilla-Walla Walla River Basins	\$2
10	Grande Ronde River Basin	\$3
11	Imnaha/Snake River Basins	< \$1
12	Hells Canyon Complex	\$4
13	Malheur River Basin	\$1
14	Couer d'Alene Lake Basin	\$5
15	Clearwater River Basin	\$9
16	Salmon River Basin	\$24
17	Southwest Idaho River Basins	\$10
18	Little Lost River Basin	< \$1
19	Lower Columbia River Basin	\$1
20	Middle Columbia Basin	\$3
21	Upper Columbia Basin	\$3
22	Northeast Washington River Basins	\$1
23	Snake River Basin in Washington	\$1
24	Columbia River	\$3
25	Snake River	\$2
	Total	\$110*
*Note: Total reflects non-rounded sum of project modification cost estimates.		

### **F.3.9            Summary of Unit-by-Unit Annual Cost Estimates**

29.            Exhibits F.10 and F.11 present estimates of total annual section 7 consultation related costs for occupied and all proposed bull trout critical habitat respectively. Exhibit F.11 inflates the estimates from Exhibit F.10 to account for the percentage of the unit's proposed critical habitat that is either not currently occupied by the bull trout, or is of unknown occupancy.
30.            The two proposed critical habitat units with the largest estimated annual costs are the Middle Columbia Basin (\$4.9 to \$5.2 million) and the Willamette River Basin (\$4.3 to \$4.6 million). Both of these units have large dam consultations currently ongoing that are expected to result in substantial costs associated with future bull trout protection. It is important to note, however, that both units are also currently in consultation with NOAA Fisheries on other listed species which will likely require very nearly the same level of expenditures to protect those species. Therefore, it is possible that some of the forecast costs for these units would be incurred regardless of the status of the bull trout and its consultation process.
31.            Other units with significant estimated annual costs include the large Salmon and Southwest Idaho River Basins in Idaho, and the Clark Fork River Basin in Montana. This is not surprising as these are generally spatially very large units.

<b>Exhibit F.10</b> <b>Total Annual Estimated Project Modification and Consultation Costs for</b> <b>Occupied Bull Trout Habitat (Thousands \$)</b>						
Unit #	Unit Name	Project Modification Costs		Section 7 Consultation Costs	Total Costs	
		Low End	High End		Low End	High End
1	Klamath River Basin	\$36	\$93	\$119	\$155	\$212
2	Clark Fork River Basin	\$499	\$1,307	\$809	\$1,308	\$2,116
3	Kootenai River Basin	\$47	\$121	\$290	\$337	\$411
4	Willamette River Basin	\$3,372	\$3,675	\$96	\$3,468	\$3,771
5	Hood River Basin	\$29	\$77	\$161	\$190	\$238
6	Deschutes River Basin	\$316	\$497	\$64	\$380	\$561
7	Odell Lake	\$3	\$7	\$49	\$52	\$56
8	John Day River Basin	\$285	\$409	\$225	\$510	\$634
9	Umatilla-Walla River Basins	\$39	\$133	\$49	\$88	\$182
10	Grande Ronde River Basin	\$56	\$162	\$388	\$444	\$550
11	Imnaha/Snake River Basins	\$18	\$65	\$544	\$562	\$609
12	Hells Canyon Complex	\$341	\$549	\$747	\$1,088	\$1,296
13	Malheur River Basin	\$182	\$249	\$1,370	\$1,552	\$1,619
14	Couer d'Alene Lake Basin	\$93	\$236	\$155	\$248	\$391
15	Clearwater River Basin	\$339	\$931	\$498	\$837	\$1,429
16	Salmon River Basin	\$707	\$1,892	\$1,246	\$1,953	\$3,138
17	Southwest Idaho River Basins	\$1,080	\$1,736	\$249	\$1,329	\$1,985
18	Little Lost River Basin	\$16	\$40	\$125	\$141	\$165
19	Lower Columbia River Basin	\$67	\$155	\$243	\$310	\$398
20	Middle Columbia Basin	\$4,286	\$4,526	\$44	\$4,330	\$4,570
21	Upper Columbia Basin	\$84	\$365	\$111	\$195	\$476
22	Northeast Washington River Basins	\$139	\$338	\$311	\$450	\$649
23	Snake River Basin in Washington	\$27	\$71	\$155	\$182	\$226
24	Columbia River	\$194	\$455	\$50	\$244	\$505
25	Snake River	\$8	\$8	\$100	\$108	\$108

Exhibit F.11						
Total Estimated Annual Project Modification and Consultation Costs for All Proposed Bull Trout Critical Habitat (Thousands \$)						
Unit #	Unit Name	Total Costs - Occupied Habitat		% Unknown Occupancy	Total Costs - All Proposed Habitat	
		Low End	High End		Low End	High End
1	Klamath River Basin	\$155	\$212	72	\$267	\$365
2	Clark Fork River Basin	\$1,308	\$2,116	0	\$1,308	\$2,116
3	Kootenai River Basin	\$337	\$411	0	\$337	\$411
4	Willamette River Basin	\$3,468	\$3,771	23	\$4,266	\$4,638
5	Hood River Basin	\$190	\$238	43	\$272	\$340
6	Deschutes River Basin	\$380	\$561	37	\$521	\$769
7	Odell Lake	\$52	\$56	0	\$52	\$56
8	John Day River Basin	\$510	\$634	19	\$607	\$754
9	Umatilla-Walla Walla River Basins	\$88	\$182	17	\$103	\$213
10	Grande Ronde River Basin	\$444	\$550	7	\$475	\$589
11	Imnaha/Snake River Basins	\$562	\$609	0	\$562	\$609
12	Hells Canyon Complex	\$1,088	\$1,296	48	\$1,610	\$1,918
13	Malheur River Basin	\$1,552	\$1,619	25	\$1,940	\$2,024
14	Couer d'Alene Lake Basin	\$248	\$391	46	\$362	\$571
15	Clearwater River Basin	\$837	\$1,429	13	\$946	\$1,615
16	Salmon River Basin	\$1,953	\$3,138	6	\$2,070	\$3,326
17	Southwest Idaho River Basins	\$1,329	\$1,985	24	\$1,648	\$2,461
18	Little Lost River Basin	\$141	\$165	8	\$152	\$178
19	Lower Columbia River Basin	\$310	\$398	20	\$372	\$478
20	Middle Columbia Basin	\$4,330	\$4,570	13	\$4,893	\$5,164
21	Upper Columbia Basin	\$195	\$476	9	\$213	\$519
22	Northeast Washington River Basins	\$450	\$649	54	\$693	\$999
23	Snake River Basin in Washington	\$182	\$226	23	\$224	\$278
24	Columbia River	\$244	\$505	0	\$244	\$505
25	Snake River	\$108	\$108	20	\$130	\$130
Note: Total costs for this table will differ slightly from total costs in row E of Exhibit 4.2 due to the differential effects of inflating costs by percent of unoccupied habitat at the unit level (as in this exhibit) and at the aggregate level (as in Exhibit 4.2).						